WILDLIFE SURVEYS HANDBOOK

CHAPTER 10 - FISH HABITAT

Contents

WILDLIFE SURVEYS HANDBOOK

11 - INTRODUCTION

11.1 - Purpose. To inventory existing fishery habitat so that measures can be taken to implement protection and enhancement of fishery values in the management of all Forest resources in accordance with FSM 2121.36, 2405.14, 2482.1, 2604.2, 2604.3, 2611, 2620, 2631, and FSH 2632.61.

Provide ecological records adequate to build logical, well founded biological unit plans on a drainage basis for fish in accordance with FSM 2624.4.

11.2 - Coordination Action. Resource Action Plans already approved will determine the order of priority for commencing the preparation of detailed fishery habitat information. Until such information can be supplied on a watershed basis, investigations will be geared to individual drainages.

State fishery agencies will be requested, in writing, to supply detailed information regarding existing fishery habitat in specified drainages before Forest Service personnel initiate fish habitat surveys.

If state agencies cannot meet a prescribed deadline for requested information independently, the Forest Supervisor will recommend to the state fishery agency director cooperative field action by state and Forest personnel to produce the needed information, or if the state director cannot or does not wish to participate in bilateral investigations, the Forest will initiate independent stream surveys.

Other agencies which may have pertinent information include:

U.S. Geological Survey

Oregon Water Resources Board

Federal Water Pollution Control Administration

U.S. Bureau of Commercial Fisheries

U.S. Bureau of Sport Fisheries and Wildlife

U.S. Army Corps of Engineers

U.S. Bureau of Reclamation.

11.3 - Data Storage. Data resulting from surveys should be available for use by all functions. A computer system is being developed for storing, summarizing, and retrieving water quality information. When this system is operational, many parameters of stream survey data can be included (FSM 2541).

11.4 - Survey Types. Fishery surveys, both streams and lakes, consist of three subdivisions:

1. Physical Habitat--inventory of physical characteristics of the water, the stream bottom, and banks.

2. Water Quality, Chemical--identifying the chemical properties of the water.

3. Biological--inventory of aquatic flora and fauna.

11.5 - Physical Habitat Survey. In most streams contained in the National Forests, physical features will be the greatest limiting factors for fish production; therefore, survey techniques emphasize this survey type.

12 - PRE-SURVEY PROCEDURES

1. Investigate all sources of presently existing information which may shorten the field surveys or make them more productive. Often local State or Federal fisheries personnel have pertinent information concerning fish species distribution, pollution problems, unpublished stream surveys, etc.

2. Coordinate stream numbering with the Forest Service watershed management system (FSM 2573.5).

3. Contact local State fisheries personnel, discuss plans, and request in writing specific information within a deadline date.

4. Study aerial photographs, determine whether U.S. Geological Survey or U.S. Army Corps of Engineers has studied stream elevations in detail or located potential water storage projects.

5. Become thoroughly familiar with the long-range fishery management program of the State fishery agencies responsible for fish management in the survey area. Knowledge of the species, and number of fish being stocked may be extremely valuable in programing priorities for surveys.

6. Train inexperienced personnel in survey techniques thoroughly before sending them into the field.

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13 - SURVEY TECHNIQUES, GENERAL. In R-6 care must be exercised in recognizing the difference in physical needs of anadromous and resident species, first when surveying streams and again when survey information is used to formulate habitat management plans. Close working relationships with State agencies will be helpful to Forests in this phase.

Initial stream surveys should be conducted at the lowest water stage. At this time the aquatic habitat usually is in its least productive condition and its importance or potential for improvement is most obvious. Follow-up observations should be made during adult migration or spawning periods or at high water if specific information on passage problems or spawning use is desirable.

Forest Service personnel must have a scientific collector's permit issued by the state fish and game agency in order to collect any fish species other than those permitted by regular angling license in season and within prescribed bag limits.

13.1 - Safety. When overnight remote area foot travel is required, an employee should never travel alone. Survey party members always should plan to meet at the end of each working day.

14 - STREAM SURVEY TECHNIQUES, SPECIFIC

1. Stream Size. A regimented policy establishing a minimum stream flow for survey purposes is not appropriate in R-6. Considerable coho salmon production takes place in streams flowing as little as 20 gallons per minute at low flow. In the other extreme, a major stream may be deferred in priority of survey need if access for fish is denied by excessive gradient.

2. Streams Not Accessible By Car. Streams normally will be traversed on foot in an upstream direction. Terrain or access conditions, making it necessary to work downstream, must be documented carefully in field notes in order to avoid errors in summary tabulations.

3. Streams Accessible By Car. Where streams are accessible by road, a survey party of two people can work efficiently by each man advancing the vehicle ahead, in turn, as the party progresses upstream.

4. Survey Unit Summary, Form R6-2600-16 (Exhibit 1). The total length surveyed on each individual stream will be a survey unit. The Survey Unit Summary will summarize information collected in the entire unit.

5. Survey Section Record, Form R6-2600-17 (Exhibit 2). The shortest survey entity in a survey unit will be the survey section, a 1/4-mile distance. As the stream is traversed upstream on foot, the average width of the stream, percent type bottom composition, the percent trout or salmon spawning area, the pool-riffle relationship, the stream gradient, evidence of bank erosion, fish migration barriers, water diversions, spring sources, pollution, beaver activity, tributary streams and photo reference will be recorded on survey section forms at the end of each survey section . Distances will be judged from maps or from the estimate of the observer by eye or pacing.

6. Survey Station Record, Form R6-2600-18 (Exhibit 3). Stations will be located:

At the beginning point of each survey unit--usually the mouth of the survey stream. The beginning survey station should be referenced on the field map by location to the nearest parent stream river mile when the parent stream is identified in Columbia Basin Inter-Agency Committee publication, "River Mile Index - Oregon and Washington."

At each major change in the volume or size of the stream--usually at the junction of tributary streams large enough to influence noticeably the volume of the survey stream.

At one mile maximum intervals.

At the terminus of each survey unit.

Refer to exhibit 3 for items which will be summarized at each survey station.

7. Fish Migration Barrier Record on Form R6-2600-19 (Exhibit 4). The location of barriers to upstream fish migration--falls, log jams, cataracts, dams, etc., --will be noted on the survey section forms, survey station forms, and field map. A fish migration barrier form will be filled out, describing the barrier location, character and degree of migration problem at low and high water. A rough sketch of the barrier will be prepared and photographs will be taken. Fish species or lack of fish should be determined in waters upstream from total fish barriers.

8. Water Diversion Record on Form R6-2600-19 (Exhibit 4). The location of stream flow diversions will be noted on the survey section forms, survey station forms, and field map. A water diversion form will be filled out describing the location, character, and size of the diversion structure. A rough sketch of the point of diversion will be made and photographs taken.

9. Spring Source Record on Form R6-2600-19 (Exhibit 4). The location of spring sources will be noted on the survey section forms, survey station forms, and field map. A spring source form will be filled out describing the location, character, flow volume and temperature of the spring water. A rough sketch of the spring source will be made and photographs taken.

10. Pollution Indicator Record on Form R6-2600-19 (Exhibit 4). The location of pollution indicators will be noted on the survey section forms, survey station forms, and field map. A pollution indicator record form will be filled out indicating the type, source, severity, and the apparent effect of the pollution on fish habitat.

11. Bank Erosion. The location of streambank erosion will be noted on the survey section forms, survey station forms, and field map. Photographs will be taken to aid in identifying problem areas. Soil samples will be collected following the survey if more detailed information is desirable.

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15 - STREAM SURVEY CRITERIA

1. Field Map will be USFS planimetric series quadrangle, 2 inches to a mile or 1 inch to a mile.

2. Section Number will be noted at the end of each 1/4-mile section of stream surveyed. Section 1 will be 1/4 mile upstream from station 1 at the beginning of each unit survey. Sections in multiples of four will correspond to station multiples of one except where stations are established at major changes in stream character, rather than 1-mile intervals.

3. Station Number will be noted at the beginning of each survey unit, at 1-mile maximum intervals, at major changes in stream character and at the terminus of each unit survey.

4. Stream Bottom Type will be recorded by percent of total of mud, sand, and gravel by diameter from 1/4 inch to 3 inches, 3 to 6 inches, 6 to 12 inches, over 12 inches, and bedrock. These percentages must total 100.

5. Stream Pool Area will be recorded by percent of:

a. Section Total--percent of the total stream surface area in the entire stream section which is deeper, more placid, and slower moving in which fish can rest and find shelter.

b. Pool Size and Depth in each survey section will be rated in number of pools by following classes:

Rate A--Pools which have surface area 100 square feet or more and depth 3 feet or more.

Rate B--Pools which have 100 square feet or more surface and depth from 1 to 3 feet.

Rate C--Pools which have 100 square feet or more surface area and depth less than 1 foot.

Rate D--Pools which have less than 100 square feet surface area and depth 3 feet or more.

Rate E--Pools which have less than 100 square feet surface area and depth from 1 to 3 feet.

Rate F--Pools which have less than 100 square feet surface area and depth less than 1 foot.

6. Stream Cover will be rated in percent of total section by the following classes:

Rate A--Stream area which is shaded by logs, debris, overhanging trees, shrubs, undercut banks, or aquatic vegetation.

Rate B--Stream area which is shaded at least part of the day by streambank vegetation not overhanging the pools.

Rate C--Stream area without streambank vegetation exposed to sunlight throughout the daylight hours.

7. Riffle Area will be considered the swifter moving, usually shallower areas in the stream which salmonid species would not likely inhabit except for feeding and protection, as contrasted to resting areas. The portion of the stream surface not classed as riffle will be pool.

8. Spawning Area for trout, salmon, and steelhead is difficult to reduce to concise, clearcut criteria. Initial stream surveys usually will be conducted at the low-water stage. Most salmonids do not spawn at the low-water stage. Good judgment of satisfactory spawning gravel for spring-spawning species is particularly difficult.

Porosity of gravel may be a major limiting factor in the use of areas which appear, on the surface, to have gravel of acceptable size. We will not consider it practical to measure porosity in our field surveys. Notes of "cemented" gravel, "high silt content" or "porosity questionable" will aid in identifying areas where the under-surface percolation of water may limit spawning use.

No attempt will be made to categorize spawning area into more than one class of desirability--good, marginal, or poor.

a. Trout spawning area will be considered that portion of the stream bottom which contains 1/4- to 1-1/2-inch diameter gravel over which water flows at depths from 6 to 24 inches at velocities from 6 inches to 2 feet per second. As in the case of steelhead, judging what the water condition will be at spawning time in the spring months during a survey conducted in late summer, is most difficult. A much more acceptable judgment can be made if the area is visited again at spawning time.

b. Salmon spawning area will be considered that portion of the stream bottom which contains 1/2- to 3-inch diameter gravel over which water flows at depths from 6 to 24 inches at velocities from 6 inches to 3 feet per second. Some preference toward the lower ranges of these criteria can be expected by coho, toward the higher ranges by fall chinook.

c. Steelhead spawning area will be considered that portion of the stream bottom which contains 1/2- to 3-inch diameter gravel over which water flows at depths from 6 to 30 inches at velocities from 1 to 3-1/3 feet per second. Refer to trout spawning criteria for survey timing.

9. Salmon Holding Pools will be pools 8 feet deep by 30 feet long, or larger. Ideal chinook salmon spawning areas contain a minimum of one such pool every 1/4 mile of stream.

10. Average Width of Stream will be the investigator's judgment of the average width of the stream throughout the stream survey section.

11. Stream Gradient will be the average gradient of a minimum of three readings in the survey section if an Abney is used. If an altimeter is used, it will be the average gradient for the entire survey section.

12. Bank Erosion will be judged in severity as:

None--banks stable, no erosion visible.

Low--confined to the stream bottom and short radius curves, primarily at high water flows.

Moderate--occurring along stream banks on long radius curves and straight sections, usually subject to active erosion during high flows.

High--silt contributed from large areas of unstable streambanks or immediately adjacent hillsides which may be the result of highly erodible soil, road construction, logging, or massive slides.

The number of linear feet of streambank affected in the severity rating in each survey section will be noted.

13. Fish Migration Barriers. Log jams, falls, cascades, and other stream obstructions will be judged whether they constitute barriers to upstream migrating fish. The extent of migration interference may range from a short delay to complete blocking of an upstream run . This extent of delay should be explored carefully before corrective measures are recommended. Observations during the period of fish passage may be required. Care must be exercised in removing obstructions in order to prevent creating a less desirable condition. The effects of erosion, gradient change, and destruction of natural cover must be considered.

Prescribing a minimum height or water velocity which will prevent fish passage is difficult. Adult steelhead have been known to ascend abrupt falls of 10 feet when other conditions--depth of jumping pool and slope of falls face--are optimum. In other cases, the volume of flow at migration time may make a combination of 4-foot high falls and debris a complete barrier. Undercut waterfalls often present extremely difficult passage conditions.

If a jumping pool having a minimum depth of 4 feet and length of 10 feet exists immediately downstream, a single falls creating a head differential up to 5 feet will not be considered a block to salmon and steelhead. Jump heights over 3 feet will be considered barriers to trout migration.

In some cases, removal of debris which is judged highly apt to move downstream, increasing the size of existing downstream log jams, can be justified for fish habitat improvement (FSM 2522.11).

14. Water Diversions which carry water from the streamcourse for any purpose will be noted. Need for screening will be prescribed.

15. Spring Sources will be located, flows estimated, and temperatures recorded. Land ownership and water rights should be noted if any use for fish habitat purposes appears feasible.

16. Photographic Reference will be made to photographs within the survey section, as appropriate.

17. Tributary Streams named and unnamed entering the survey section will be noted.

18. Beaver Activity will be noted.

19. Pollution Indicator presence or absence will be recorded.

20. Stream Depth Average will be the average of depth measurements made at the survey station.

21. Stream Flow. In streams having a maximum depth of 3 feet and a stable gravel or bedrock bottom on a selected cross-section area, and water velocity from 1 to 8 feet per second, stream volume will be calculated using the velocity by head rod method (VHR).

In streams having soft bottoms, depths in excess of 3 feet or velocities less than 1 foot per second or more than 8 feet per second or other conditions, including safety procedures, which prohibit using VHR, stream volume will be calculated by the float method. The float method has obvious disadvantages and its accuracy is limited.

Velocity and Volume of Flow by Head Rod Method. A dependable yet cheap and rugged measuring rod has been developed to facilitate the calculation of discharges from small streams. This device is particularly useful in gaging small volumes of flow containing varying amounts of bedload and silt. The instrument is simple, portable, easy to construct, and accurate within practical requirements. Instructions for using VHR are contained in FSH 7411 (5652.1), Water Developments and Sanitation Handbook, appendix A. Form R6-2500-3, Discharge

Measurement Record, should be used to record measurements. Form R6-2500-1, Common Conversions and Equivalents Used in Watershed Management, contains valuable information in summarizing field data.

Volume of Flow by Float Method. Volume of flow in cubic feet per second may be calculated by the formula W x D x a x V.

W = width

D = depth

a = constant for bottom type

V = velocity

Measurement Section. Locate a 100-foot long stream section which is straight and has fairly uniform bottom conditions.

Stream Width. Measure stream width at the upper and lower stations (ends) of the section. Average the two widths.

Stream Depth. Measure depth in tenths of feet at the upper and lower stations. The depth measurement is obtained by adding measurements at 1/4, 1/2, and 3/4 of stream width and dividing by 4 to allow for gradation to 0 depth at edges. Record each average depth. Obtain the overall average.

Float Time. Record the time in seconds required for a deep-floating object to traverse the 100 feet of stream length.

Velocity. Compute velocity (feet/second) by dividing the average time into 100 feet (minimum of 3 measurements).

Constant. Use appropriate constant for bottom type; i.e., 0.9 for smooth bottom--sand, silt, hardpan; 0.8 for rough bottom--rubble, coarse gravel.

22. Gravel Samples will be identified by number and survey section. Three samples should be taken at the first survey station in each survey unit and at any other point in the unit deemed advisable by the observer. They should be taken from spawning riffles in a line perpendicular to stream flow, one in the middle of the stream and one each equidistant between the middle and the streambanks.

Samples will be removed from the streambed with the sampler (Figure 1). The sampler is stainless steel and is round in cross section. The tube of the sampler is worked manually into the gravel to a depth of 10 inches. Contents of the tube are dug by hand and lifted into the basin. Because the water is continuously agitated, the finest materials pass into and remain in suspension as the sample is collected. After solids are removed from the tube and placed in the basin, a watertight cap is inserted in the tube to retain water and suspended solids in the basin.

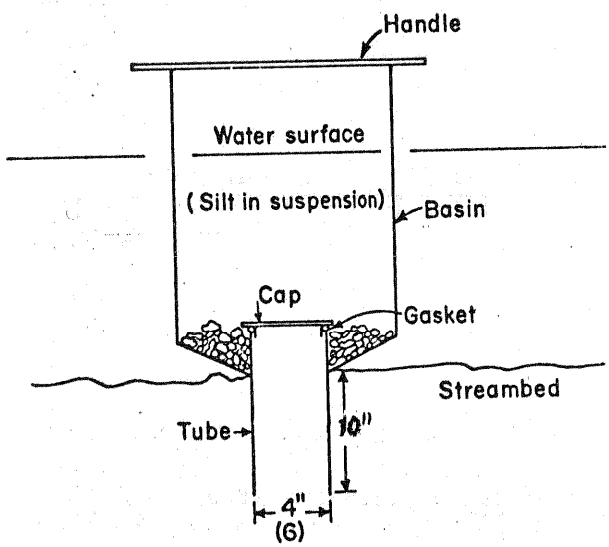

Figure 1.--Sampler for collecting bottom materials.

This technique introduces some bias because of the loss of silt in suspension within the tube as the sampler is lifted from the stream. Samples collected during low stream discharge no doubt contain a greater absolute quantity of solids in suspension within the tube, on the average, than samples collected during periods of high stream discharge. Sampling usually is restricted to periods of low discharge.

The diameter of the tube used at a particular location depends on the size of the gravel. A 4-inch-diameter tube is used in most streams sampled. In a stream with coarse gravel, it is necessary to use a 6-inch-diameter tube. After a sample is removed from the streambed, it is transferred to 10-quart plastic buckets to facilitate handling, or a plastic jar if transportation is required. After at least 10 minutes have elapsed to allow suspended materials to settle, excess water is decanted from the buckets. Bottom samples are separated into ten size classes by washing and shaking them through nine standard Tyler sieves having the following square mesh openings (in mm.):

26.26	1.65
13.33	0.833
6.68	0.417
3.33	0.208
	0.104

Silt passing the finest screen is collected in a vessel.

Washing samples through sieves is efficient and affords nearly complete separation of size groups. One problem with very fine sieves, however, is their tendency to become clogged and to retain water. The finest

sieve (0.104 mm.) is the smallest that allows water and suspended materials to pass through without seriously clogging the sieve. If the material is particularly difficult to screen, it is acceptable to report the total volume smaller than 3.33 mm. in one measurement.

After passing through the finest screen, water and suspended materials are placed in a large funnel and allowed to settle for ten minutes (Figure 2). The volume of settled solids is then measured. Solids remaining in suspension are discarded.

The volume of solids retained by each sieve is measured after the excess water is drained off. The contents of each of the larger sieves (26.26 through 0.417 mm.) are placed in the device shown in figure 3, and the water displaced by solids is collected in a graduated cylinder and measured. Solids retained by the small diameter sieves (0.208 and 0.104 mm.) may be washed into a graduate with a measured volume of water, and the increase in volume read directly. In these instances, the fines are transferred to the graduate through a 6-inch plastic funnel.

Two men can sort a sample and measure the volume of solids retained on each sieve in about 10 minutes.

The volume of individual samples collected with the bottom sampler will vary somewhat from point to point but generally will be within 10 percent of the mean. Variation in sample volumes is caused by variation in porosity and core depth. All sample fractions are expressed as a percentage of the sample.

23. Number of Anglers will be counted between each survey station as the investigator proceeds upstream.

24. Fish Species observed will be identified to species whenever possible. Observations of size, condition, and numbers should be noted.

25. Fish Food organisms will be identified by common names when possible. Principal aquatic larval forms will be collected using the standard square foot bottom sampler. Stream bottom material from a riffle will be washed upstream from the frame causing the larval forms to be dislodged and deposited in the cloth cone. No attempt will be made to determine the total volume of food organisms on a prescribed bottom area.

26. Stream Turbidity will be judged clear if the stream bottom is visible at 4 feet depth or more; murky, if visible at 1- to 4-foot depths; and turbid if visible at a maximum of 1 foot deep. Usually, observations for turbidity are of little value when they are made at low-water stage. More meaningful data can be collected during spawning or incubating periods, following or during storms, or at high flows. If turbidity is suspected to be a problem in fish production, water samples should be collected, analyzed, and expressed in Jackson Candle Units (ppm. silican dioxide).

27. Streambottom Stability will be judged as stable if the streambottom material is reasonably immobile--bedrock, large boulders, low gradient, etc., --and unstable if it is reasonably mobile--loose gravel moved readily by higher water and gradient.

28. Stream Improvement Measures Needed will be described briefly on the station record, followed by a complete documentation on the stream improvement analysis form.

29. Impoundment Sites will be located, a brief description provided, and recommendations for future surveys made.

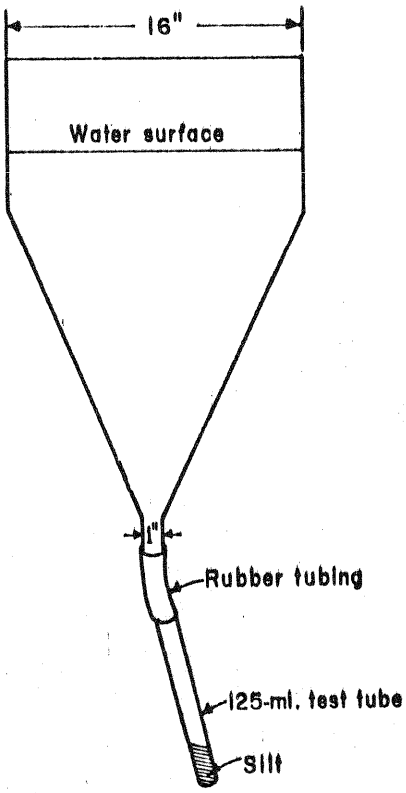

Figure 2.--Settling funnel for collecting silt fraction in bottom materials.

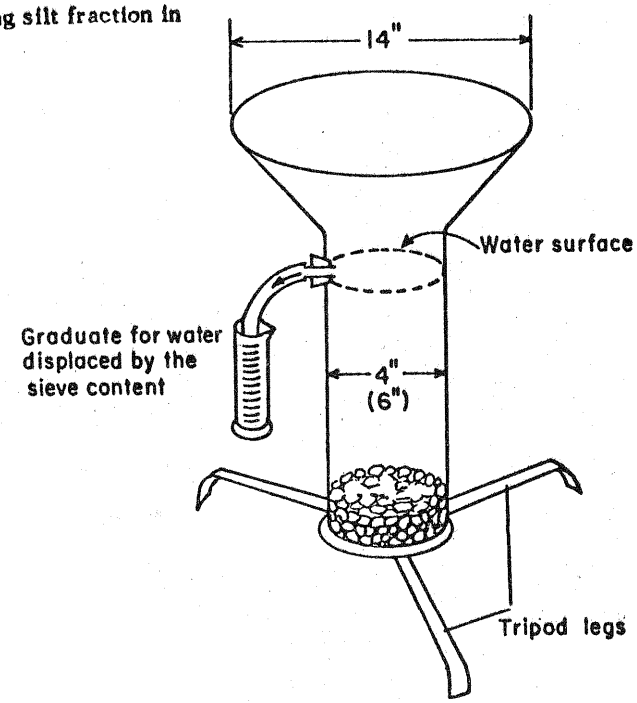

Figure 3.--Device for measuring the volume of water displaced by solids retained by sieves.

Exhibit 1

STREAM SURVEY UNIT SUMMARY

1. Stream Trout Creek
2. Tributary to Salmon River
3. Location Station No. 1 S 29 T 21 S R 15E
4. Watershed Salmon River
5. Watershed No. 6315-004
6. Forest Pine
7. District Sugar
8. Dates of Survey 7/12/68 to 7/21/68
9. Investigator A. B. Code
10. Total Survey Sections 23, Stations 7
11. Total miles live stream in Forest 11
12. Miles surveyed: Total 6 Forest Service 5.8 Private 0.2
13. Major tributary streams Rainbow, Cutthroat and Bass Creeks
14. Water source primarily snow - Some lakes in Cutthroat drainage
15. Water flow measurements (date, flow, location) 7/12/68 - 147 cfs - Sta 2; 7/21/68 - 30 cfs - Sta. 7 - See Station Records
16. Water chemistry (pH, O_2, etc.) No samples taken
17. Temperatures (water, air-location, time) Water 63°F, air 89°F 1430 7/12/68 Sta 2; water 52°F, air 71°F 7/21/68 Sta. 7.
18. Stream accessibility (roads, trails, bridges) Forest Hwy. 6701 on Rt. bank along lower 4 miles, trail to survey terminus.
19. Stream fishability (summarize difficulty of access, streamside brush, etc.) Road and trail on Rt. bank, footbridge crosses to Lt. bank in Survey Section 20 -
20. Angler use Light - 17 anglers observed in 8 survey days.
21. Fish species, size 24 RB 4-11 in. (shocker w/OSCC) - See Reverse side
22. Altitude (minimum to maximum) 5540 - 2260 (in 6 miles)
23. Gravel sample analysis 3 samples taken at Sta. 6 - See Reverse side

R6-2600-16

24. General character of watershed (slope, logging, overstory, understory, etc.) ___
Lower area primarily Doug-fir, steep, about 30 percent logged to date, no serious silt problems at present. Higher in drainage large wildfire (1959) on left bank is contributing considerable turbidity to stream.

25. Fish spawning area (total - salmon, steelhead, trout) Chinook Sal 4090 sq. yds.; Steelhead 210; Trout none - too much water

21. (cont.) In lower stream section many whitefish 7-11 inches were seen - with OSGC fish biol., collected several suckers, dace and sculpins in upper 4 survey sections.

23. (cont.) Av. 3 samples

MM	%	MM		%
26.26 +	57	0.833 - 1.65		1
13.13 - 26.26	26	0.417 - 0.833	<	1
6.68 - 13.13	5	0.208 - 0.417	<	1
3.33 - 6.68	4	0.104 - 0.208	<	1
1.65 - 3.33	6			

Exhibit 2

SURVEY SECTION RECORD (1/4-Mile Intervals)

Date 7/12/68

Stream Trout Cr. Forest Pine District Sugar Sheet 1 of 2

Watershed Salmon R. Watershed No. 63615-004 Observer A.B. Code

Sect No.	Sta No.	Bottom Type (% of Total)							Pool Area							Riffle Area			Stream Cover by % of total			Redds	
									% of Sect.	No. by Size and Depth Class						% Spawning							
		Mud	Sand	¼-3	3-6	6-12	12+	Bed-rock	Total	A	B	C	D	E	F	Tr.	Sth.	Sal.	A	B	C	Sal.	Sth.
	1	See Station Record #1																					
1		0	0	10	5	70	10	5	80	5	2	4	0	0	0	0	0	0	0	70	30	0	0
2		0	10	20	20	30	10	10	50	1	3	5	0	0	0	0	0	0	0	60	40	0	0
3		0	10	20	40	10	20	0	40	1	4	0	0	0	0	0	5	10	0	80	20	0	1?
4	2	5	10	20	40	10	20	0	40	3	1	0	0	0	0	0	5	20	0	80	20	0	2
5																							

R6-2600-17

No. Sal. Hold Pools	Av. Ft. Width Stream	Grad-ient	Bank Erosion		Fish Mig. Barrier		Water Diversion		Spring Source		Photo. Ref. No.	Tributary Stream(s)	Beaver Activity		Pollution Indicator	
			Sev.	Lin. Ft.	Yes	No	Yes	No	Yes	No			Yes	No	Yes	No
3	50	1	A	–		✓		✓		✓	T-1	None		✓		✓
1	40	2	B	150		✓		✓		✓	–	None		✓		✓
0	40	2	A	–	log jam	✓	✓			✓	T-3,4	None		✓		✓
0	40	2	C	50		✓		✓		✓	T-5,6	Rainbow Cr.		✓	✓	

Exhibit 3

Station 2 of 7

SURVEY STATION RECORD (1-mile intervals)

1. Stream Trout Cr. 2. Watershed Salmon R.
3. Watershed No. 6315-004 4. Date 7/12/68
5. Forest Pine 6. District Sugar
7. Weather Partially Cloudy 8. Investigator A. B. Code
9. Station No. 2 10. Includes Sections 1 through 4
11. Time of day 1430 12. Water temp 63°F 13. Air 89 °F
14. Altitude 1540 ft. m.s.l. 15. Stream width 40 ft.
16. Av. stream depth 22 inches 17. Stream flow 147 cfs. (VHR) Float
18. Gravel sample Nos. None 19. Beaver activity yes ____ no ✓
20. No. anglers since previous station 4
21. General character of watershed (slope, logging status, overstory, understory, species, % forested Forest Hwy 6701 borders stream on left bank. Road fill runs along entire length of survey section. Old growth Douglas-fir above road. Small burn (20 acres) which occurred in 1960 has established good Douglas-fir reprod and soil erosion is not evident. Right bank hillside is steep - Left bank hillside is primarily second growth Doug-fir following logging in 1956. No erosion from hill above high water line.
22. Vegetation, aquatic (% of bottom attached, clinging) None - Considerable washing at high flows apparent - Some algae on rocks in quiet areas.
23. Vegetation, terr. (% streambank, species) No vegetation on banks from low water to high water mark (about 6' vertical) See item 21.

R6-2600-18

24. Streambanks (slope, gravel, dirt, bedrock) Right bank is mod. fill having considerable dirt in fill - Left bank slopes gradually into stream, has boulders 12" and larger - stable.

25. Erosion (hillsides, severity, causes) Right hillside has recovered from small burn in Doug-fir old growth. Left bank stabilized by Doug-fir reprod following 1956 logging.

26. Erosion (streambanks, severity, causes) Right bank has 200 ft. road fill which is being eroded at toe by high water. Remaining Rt. and Lt. banks mostly boulders 12" and larger and stable.

27. General stream character (meandering, narrow channel, cascades, etc.) This 1/4 mile is nearly straight, gradient is constant. Bottom gravel indicates some movement at high flows.

28. Fish species observed, size, number No fish observed. One angler reported catching 12 pound steelhead. 7/2.

29. Fish food (scarce, plentiful, kinds, etc.) Mayfly and stonefly nymphs appear to be the most plentiful food source, though they are limited in number.

30. Stream turbidity (clear, murky, turbid) Water clear - Some silt on bottom in Sect. 4 indicates turbid water sometime during year.

31. Streambottom stability Gravel in riffle areas indicates considerable movement at high flows.

32. Stream improvement measures needed See fish barrier form for log jam - Log jam should be removed and riprap should be placed along road fill.

Exhibit 4

Barrier, Diversion, Spring, and Pollution Indicator Record

NOTE Use separate sheet to report each category (barrier, diversion, etc.)

1. Stream Trout Creek
2. Tributary to Salmon River
3. Watershed No. 63615-004
4. Location on Stream Fish stream survey, sect. 3 - mouth Rainbow Cr.
5. Ownership of Structure None
6. Land ownership at site U.S.F.S.

Barrier

1. Type of barrier Log jam
2. Degree of fish block at low water _____ high _____
   No block yet, but size of jam is increasing each year & will become a block.
3. Fish species affected Chinook salmon, Steelhead, Cutthroat trout

Diversion

1. Type of diversion Irrigation
2. Period of operation 6-15 to 8-31
3. Diversion water flow 10 cfs
4. Diversion screened yes _____ no ✓
5. Type of screen _____
6. Fish loss yes ✓ species Not identified no ___ unknown ___
7. Fish species present in stream Ch. Sal-Stl-RB-Ct-Sculpin-Suckers

Spring Source

1. Spring name Unnamed
2. Flow Est 0.5 cfs
3. Temperature 47 °F.
4. Odor yes _____ no ✓
5. Water sample collected yes _____ no ✓
6. Water sample analysis date _____ See attached analysis report
7. Water rights filed yes _____ date _____ no ✓

See reverse side for Pollution Indicator and structure, site description and photos.

R6-2600-19

Pollution Indicator

1. Type of indicator (mine, sewage, algae, etc.) Mine
2. Source Gable Gold Mine
3. Severity Water draining from shaft is red in color, depositing a visible layer on the stream bottom for about 1/4 mile downstream.
4. Identifiable effect on fish habitat No known adverse effect on fish life - Esthetic effect is severe.

Description of Site, Structures, Photos

16 - STREAM IMPROVEMENT PROPOSAL

1. Stream Improvement Proposal, Form R6-2600-20 (Exhibit 1). If the information gathered on the stream survey indicates that stream improvement is needed and practical, a stream improvement proposal form will be filled out.

(Continued on next printed page)

Exhibit 1

Observer A. B. Code

Date 7/12/68

STREAM IMPROVEMENT PROPOSAL

1. Location of proposed site, structure or improvement Trout Creek, Salmon River Watershed 63615-004, Survey Sect. 3.
2. Type of Improvement Remove log jam - Burn on bank
3. Dimensions, etc. (include sketch) Log jam on left bank - 20 ft. long and 10 ft. high - See reverse side for sketch
4. Materials Doug fir non-manufactured mostly, some logging debris
5. Planning Cost $100
6. Labor Cost $500 Transportation Cost $150
7. Estimated Longevity of Improvement Perpetual
8. Est. Annual Maintenance Cost None
9. How was need of this improvement determined Fish stream survey - Observation indicates this barrier is collecting more debris and eventually will become a block to migrating salmon and steelhead
10. Effects Desired (Environmental) Remove the log jam from the stream
11. Biological Effects Desired Permit unrestricted fish passage
12. Esthetic Qualities Some improvement to scenic appearance from Forest Hwy. 6701.
13. Coordination with State Fish and Game, Fish and Wildlife Service Dist. Game Comm. Fish Biol approved jam removal 6-13-68. Recommends removal between Sept 1 and Oct 15. Blasting in stream shd be avoided
14. Review and Recommendations (Coordination with other resources) Fire danger extreme because of old growth near site - Job Corps might be utilized here - Removal will reduce possibility of Hwy fill damage by high water.

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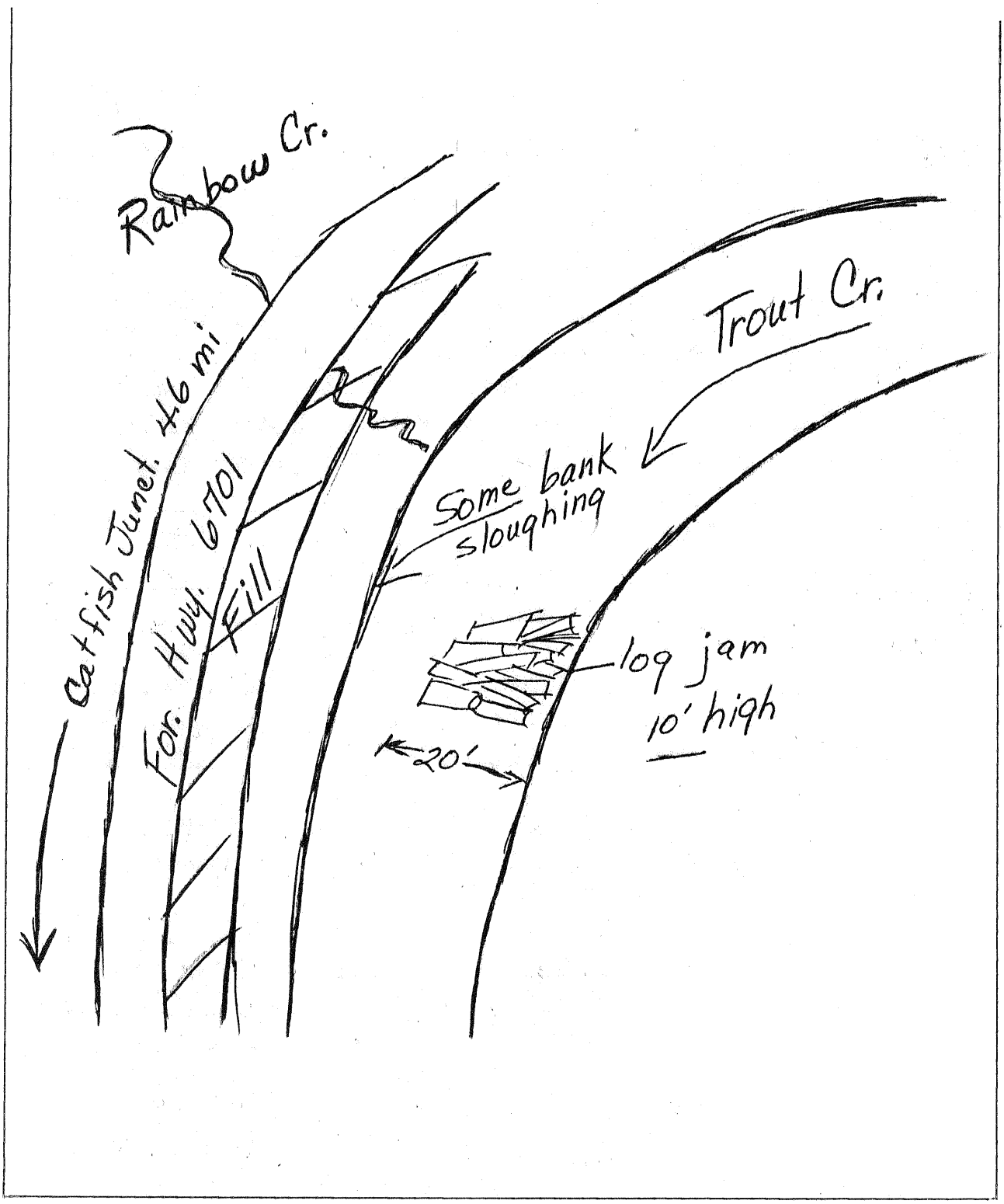
Rainbow Cr.
Catfish Junct. 46 mi
For. Hwy. 6701
Fill
Trout Cr.
Some bank sloughing
log jam
10' high
20'